



The Apogee SP-110 Pyranometer measures the total solar global irradiance: a measure of the rate of total incoming solar energy (both direct and diffuse) on a horizontal plane at the Earth's surface.

Used in a wide variety of climates, ranging from the Himalayas in Nepal to the Australian outback.

Calibration Factor

The pyranometer can be used to find the instantaneous value of the solar irradiance in W/m^2 or by integration to find the total energy per square meter which strikes the instrument during a given period. The calibration factor K can be expressed as follows: $K = 200 \text{ mV}/(kW/m^2)$

This value means that when the solar irradiance equals $1 \text{ kW}/m^2$ (typical for a clear, sunny day around noon), then the pyranometer output voltage will be about 200 mV. If the output voltage for example is 100 mV, then the solar irradiance would be about $0,5 \text{ kW}/m^2 = 500W/m^2$.

In other words:

$$S[kW/m^2] = U[mV]/K$$

where U is the signal voltage in millivolts, and S is measured in kW/m^2 .

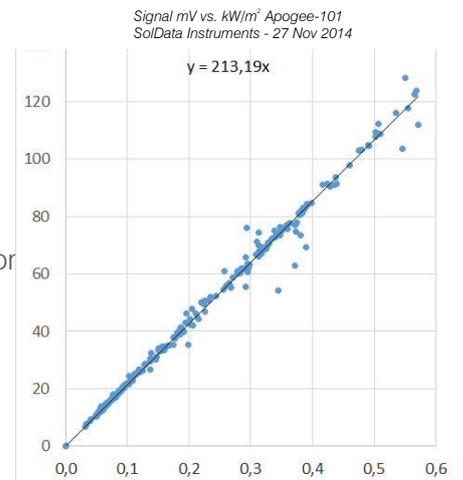
Cable Connections

The SP-110 is supplied with a 4.8 meter cable with a waterproof connector to the instrument. The electrical connections to the cable are as follows:

- red: signal plus (0-250 mV)
- black: signal ground
- white: cable shield (ground)

Specifications

- Power Supply:** Self powered
- Sensitivity:** 0.20 mV per $W \text{ m}^{-2}$
- Calibration Factor:** 5.0 $W \text{ m}^{-2}$ per mV (reciprocal of sensitivity)
- Calibration Uncertainty:** $\pm 5 \%$
- Measurement Repeatability:** $< 1 \%$
- Non-stability (Long-term Drift):** $< 2 \%$ per year
- Non-linearity:** $< 1 \%$ (up to 1750 W m^{-2})
- Response Time:** $< 1 \text{ ms}$
- Field of View:** 180°
- Spectral Range:** 360 nm to 1120 nm (wavelengths where response is 10 % of max.)
- Directional (Cosine) Response:** $\pm 5 \%$ at 75° zenith angle
- Temperature Response:** $-0.04 \pm 0.04 \%$ per C
- Operating Environment:** -40 to 70 C , 0 to 100 % relative humidity
- Dimensions:** 2.40 cm diameter and 2.75 cm height
- Mass:** 90 g (with 5 m of lead wire)
- Warranty:** 4 years



Typical calibrations data: Apogee pyranometer compared to the Kipp-Zoen CM21

